



INTERNATIONAL TELECOMMUNICATION UNION

CCITT

Q.85

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

FUNCTIONS AND INFORMATION FLOWS FOR SERVICES IN THE ISDN

STAGE 2 DESCRIPTION FOR COMMUNITY OF INTEREST SUPPLEMENTARY SERVICES

SECTION 1 – CLOSED USER GROUP (CUG)

SECTION 3 – MULTI-LEVEL PRECEDENCE AND
PREEMPTION (MLPP) (rev.1)

**Modifications and addenda to:
Recommendation Q.85**



Geneva, 1992

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the International Telecommunication Union (ITU). CCITT is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation Q.85, §§ 1 and 3 was prepared by Study Group XI and was approved under the Resolution No. 2 procedure on the 4th of February 1992.

CCITT NOTE

In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication Administration and a recognized private operating agency.

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Recommendation Q.85

STAGE 2 DESCRIPTION FOR COMMUNITY OF INTEREST SUPPLEMENTARY SERVICES

1 Closed User Group (CUG)

1.1 Scope

This Recommendation defines the stage 2 of the integrated services digital network (ISDN) as provided by telecommunications operators for the Closed User Group (CUG) supplementary service. Stage 2 identifies the functional capabilities and the information flows needed to support the service description. The Stage 2 description also identifies user operations not directly associated with a call (see Recommendation I.130 [1]).

This Recommendation is specified according to the methodology specified in Recommendation Q.65 [2].

This Recommendation does not formally describe the relationship between this supplementary service and the basic call, but where possible, this information is included for guidance.

In addition, this Recommendation does not specify the requirements where the service is provided to the user via a private ISDN. This Recommendation does not specify the requirements for the allocation of defined functional entities within a private ISDN, it does however, define which functional entities may be allocated to a private ISDN.

This Recommendation does not specify the additional requirements where the service is provided to the user via a telecommunications network that is not an ISDN.

The CUG supplementary service enables users to form groups to and from which access is restricted. A specific user may be a member of one or more closed user groups. Members of a specific Closed User Group can communicate among themselves but not, in general, with users outside the group.

The CUG supplementary service is applicable to all telecommunication services.

This Recommendation is applicable to the stage 3 Recommendations for the ISDN CUG supplementary service. The term "stage 3" is also defined in Recommendation I.130 [1].

1.2 References

This Recommendation incorporates by dated or undated reference, provisions from other publications. These references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to, or revisions of any of these publications apply to this Recommendation only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] CCITT Rec. I.130 — *Methods for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN*, 1988.
- [2] CCITT Rec. Q.65 — *Stage 2 of the method for the characterization of services supported by an ISDN*, 1988.
- [3] CCITT Rec. I.112 — *Vocabulary of terms for ISDNs*, 1988.
- [4] CCITT Rec. Q.71¹⁾ — *ISDN 64 kbit/s circuit mode switched bearer services*, 1988.
- [5] CCITT Rec. I.255.1 — *Closed User Group*.

¹⁾ Recommendation Q.71 will be submitted for approval at the CCITT Plenary Assembly in March, 1993.

- [6] CCITT Rec. I.210 — *Principles of telecommunication services supported by an ISDN and the means used to describe them*, 1988.
- [7] CCITT Rec. Q.950 — *Supplementary services protocols — Structure and general principles*.
- [8] CCITT Rec. Q.931.— *ISDN user-network interface layer 3 specification for basic call control*.
- [9] CCITT Rec. Q.763.— *Specifications of Signalling System No. 7 — Formats and codes*.

1.3 Definitions

For the purposes of this Recommendation, the following definitions apply:

Integrated services digital network (ISDN)

See Recommendation I.112 [3], § 2.3, definition 308.

Service, telecommunications service

See Recommendation I.112 [3], § 2.2, definition 201.

Supplementary service

See Recommendation I.210 [6], § 2.4.

Closed User Group

Grouping of users with common availability requirements.

preferential CUG

A preferential Closed User Group is the nominated default group to be used when no Closed User Group or explicit outgoing access request is received by the network.

incoming access

An arrangement which allows a member of a Closed User Group to receive calls from outside the Closed User Group.

outgoing access

An arrangement which allows a member of a Closed User Group to place calls outside the Closed User Group.

incoming calls barred within a Closed User Group

An access restriction that prevents a Closed User Group member from receiving calls from other members of that group.

outgoing calls barred within a Closed User Group

An access restriction that prevents a Closed User Group member from placing calls to other members of that group.

Closed User Group call

A call is a call which is restricted to a pre-defined group of users.

CUG domain

An area of common CUG interlock codes.

The domain internal CUG interlock codes need not be released via the boundary of the domain.

A Closed User Group application may span over several domains. Both domains shall treat the other domain's Closed User Group as a single member of its own Closed User Group.

1.4 *Symbols and abbreviations*

CC	Call Control
CCA	Call control agent
CUG	Closed User Group
DB	Data base
FE	Functional entity
FEA	Functional entity actions
IA	Incoming access
ICB	Incoming calls barred
IIC	Incoming international centre
ISDN	Integrated services digital network
LE	Local exchange
OA	Outgoing access
OCB	Outgoing calls barred
OIC	Outgoing international centre
PCUG	Preferential CUG
PN	Private network
TE	Terminal equipment

1.5 *Description*

The general description of the CUG supplementary service is specified in Recommendation I.255.1 [5].

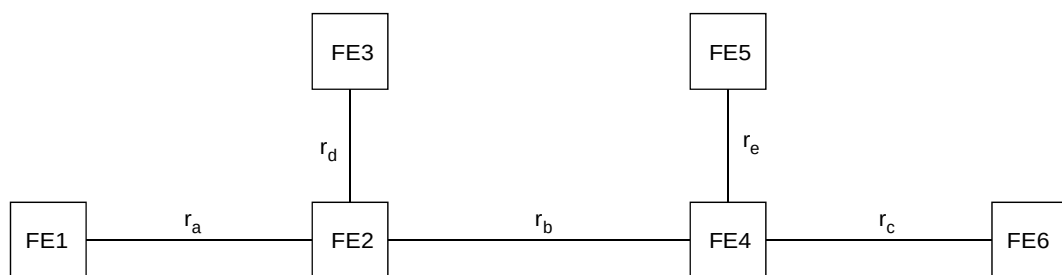
1.6 *Derivation of the functional model*

1.6.1 *Functional model description*

The functional model for the CUG supplementary service shall be as shown in Figures 1-1/Q.85 and 1-2/Q.85.

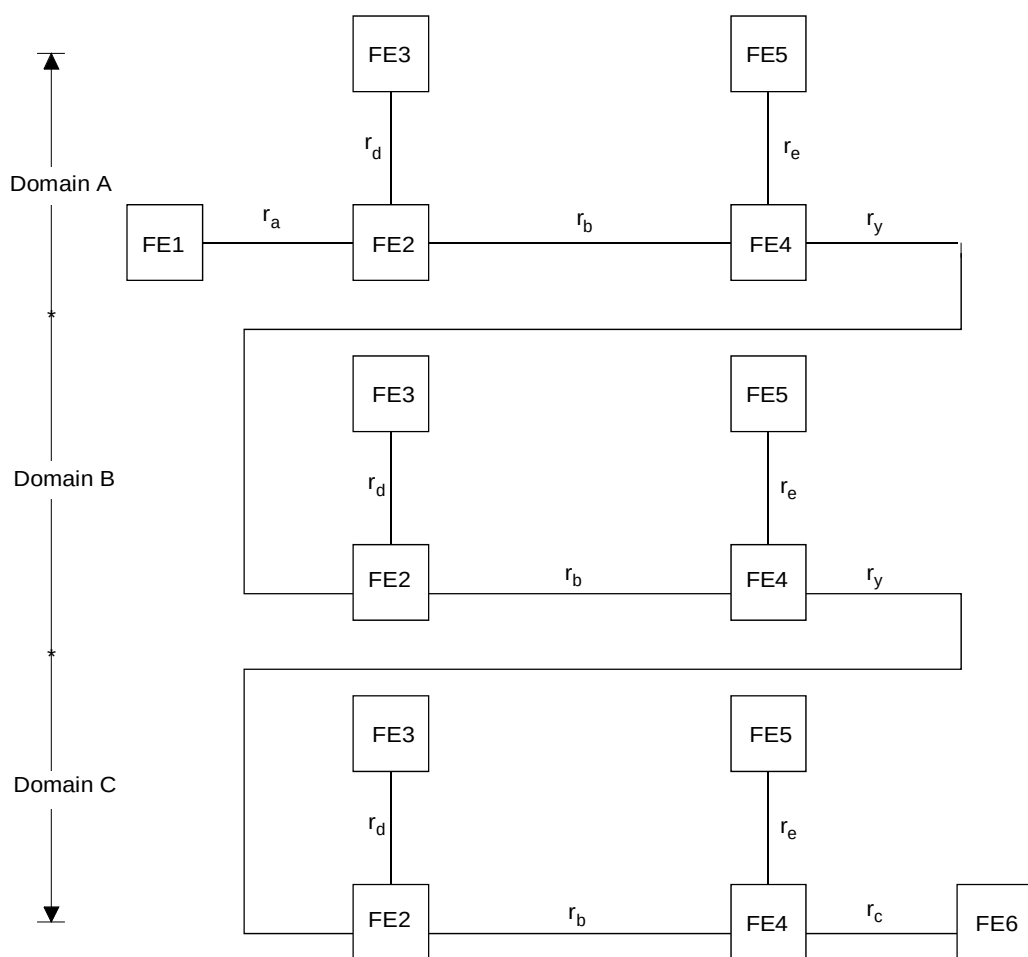
The functional model for the application of the CUG supplementary service within a single CUG domain shall be as shown in Figure 1-1/Q.85.

The expanded functional model used for interworking between CUG domains shall be as shown in Figure 1-2/Q.85.



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FIGURE 1-1/Q.85



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FIGURE 1-2/Q.85

Expanded functional model

1.6.2 Description of the functional entities

The functional entities for the CUG supplementary service shall be as shown below:

- FE1 Originating CUG agent
- FE2 Outgoing CUG determination
- FE3 Outgoing CUG control
- FE4 Incoming CUG determination
- FE5 Incoming CUG control
- FE6 Destination CUG agent

1.6.3 Relationship with a basic service

The relationship of the functional model for the CUG supplementary service with a basic call may be as shown in Figure 1-3/Q.85.

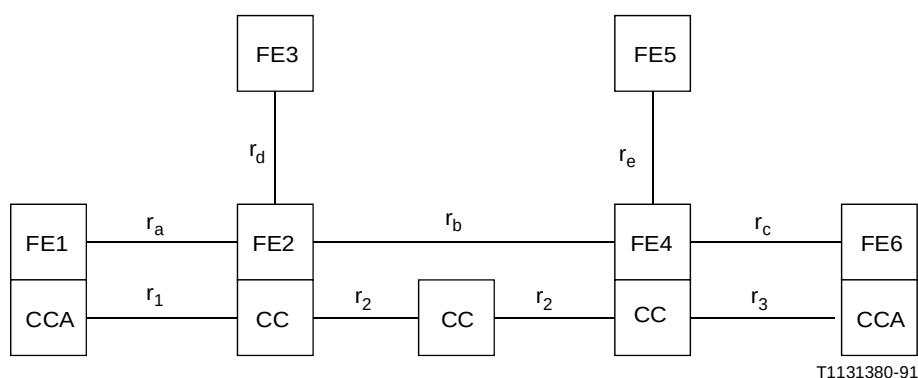


FIGURE 1-3/Q.85

Relationship of the model to a basic call

1.7 Information flows

1.7.1 Information flow diagrams

The information flows for the CUG supplementary services shall be as shown in Figures 1-4/Q.85 to 1-8/Q.85. Figures 1-5/Q.85 and 1-8/Q.85 show a portion of the flows appropriate to a call across multiple domains.

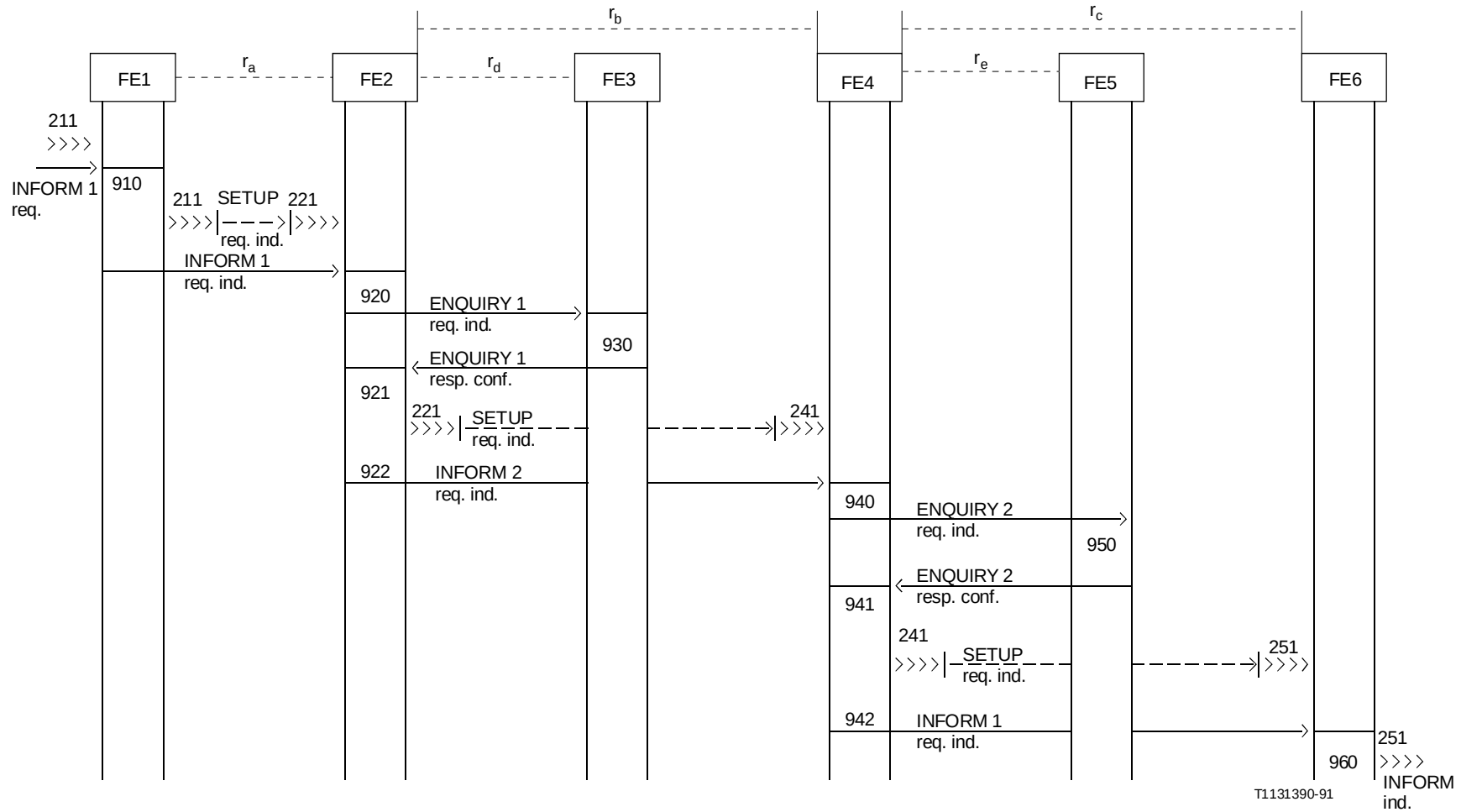
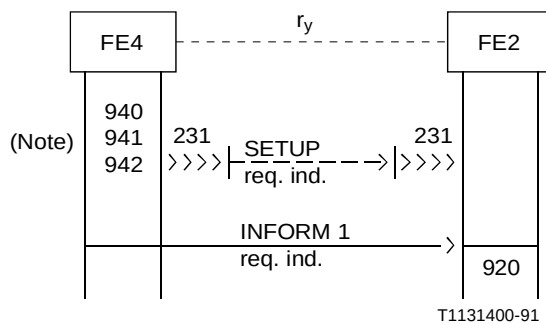


FIGURE 1-4/Q.85
Successful CUG calls own domain

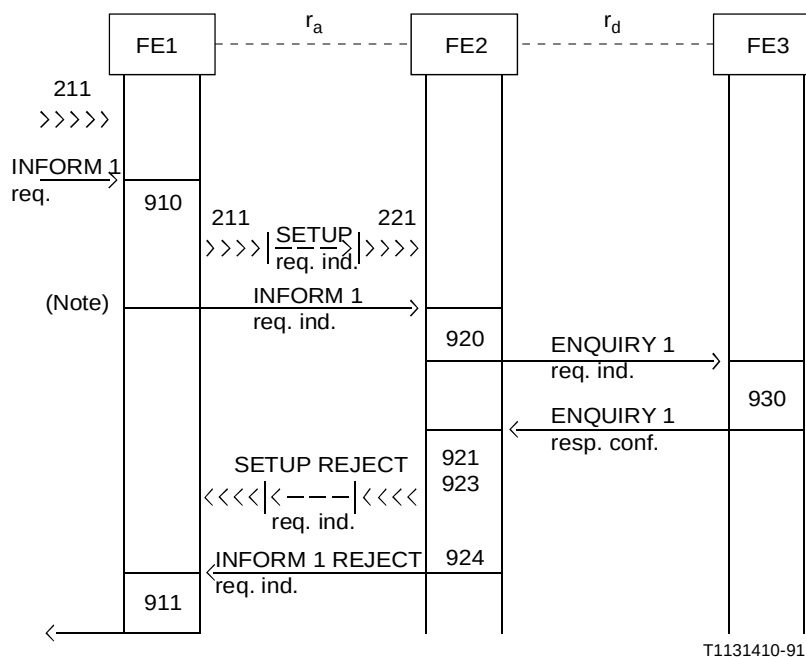


Note – Call to this point is covered in Figure 1-4/Q.85.

FIGURE 1-5/Q.85

Chaining of CUG domains

(Successful CUG calls between different CUG domains showing information flows across relationship r according to the functional model in Figure 1-2/Q.85.)



Note – Depending on the progress of the basic call INFORM 1 REJECT will be sent simultaneously with the appropriate basic call clearing information flow.

FIGURE 1-6/Q.85

Unsuccessful CUG calls – Case 1 own CUG domains

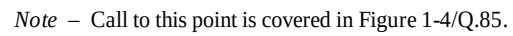
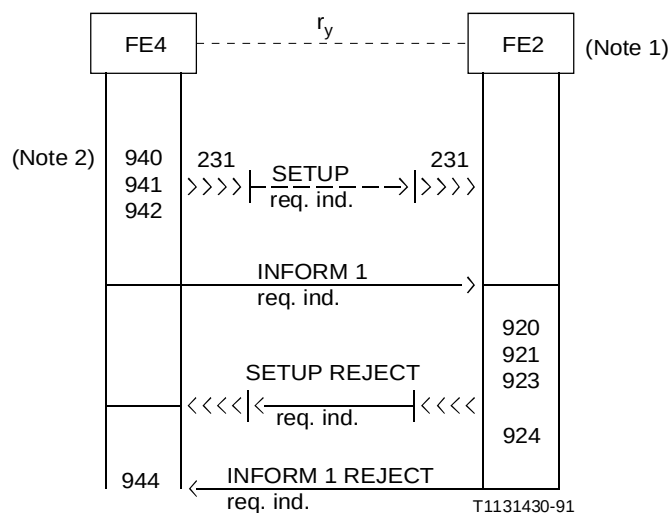


FIGURE 1-7/Q.85

Unsuccessful CUG calls – Case 2 own CUG domain



Note 1 – Call to this point is covered in Figure 1-4/Q.85.
Note 2 – Depending on the progress of the basic call INFORM 1 REJECT will be sent simultaneously with the appropriate basic call clearing information flow.

FIGURE 1-8/Q.85
Chaining of CUG domains

(Unsuccessful CUG calls between different CUG domains showing information flows across relationship r_y according to the functional model in Figure 1-2/Q.85.)

1.7.2 Definition of individual information flows

1.7.2.1 Relationship r_a

1.7.2.1.1 Contents of INFORM 1

The contents of INFORM 1 shall be as in Table 1-1/Q.85. INFORM 1 is an optional information flow.

TABLE 1-1/Q.85

INFORM 1 contents

Name	req. ind.	Allowed value
CUG index	optional	
OA indication	optional	ON OFF

1.7.2.1.2 Contents of INFORM 1 REJECT

The contents of INFORM 1 REJECT shall be as in Table 1-2/Q.85.

TABLE 1-2/Q.85

INFORM 1 REJECT contents

Name	req. ind.	Allowed value
CUG specific reason	Mandatory	(Note)

Note – For allowed values, see Recommendation Q.950 [7].

1.7.2.2 *Relationship r_b* 1.7.2.2.1 *Contents of INFORM 2*

The contents of INFORM 2 shall be as in Table 1-3/Q.85. INFORM 2 at r_b is an optional information flow.

TABLE 1-3/Q.85

INFORM 2 contents

Name	req. ind.	Allowed value
CUG interlock code OA indication	Mandatory (Note 1) Optional	(Note 2) ON OFF

Note 1 – Where the INFORM 2 information flow crosses an international gateway, the CUG interlock code shall be an international CUG interlock code.

Note 2 – As specified in § 3.13 of Recommendation Q.763 [9].

1.7.2.2.2 *Contents of INFORM 2 REJECT*

The contents of INFORM 2 REJECT shall be as in Table 1-4/Q.85.

TABLE 1-4/Q.85

INFORM 2 REJECT contents

Name	req. ind.	Allowed value
CUG specific reason	Mandatory	(Note)

Note – For allowed values, see Recommendation Q.950 [7].

1.7.2.3 *Relationship r_c*

INFORM 1, see § 1.7.2.1.1.

INFORM 1 REJ, see § 1.7.2.1.2.

1.7.2.4 Relationship r_d

1.7.2.4.1 Contents of ENQUIRY 1

The contents of ENQUIRY 1 shall be as in Tables 1-5/Q.85 and 1-6/Q.85.

TABLE 1-5/Q.85
ENQUIRY 1 contents

Name	req. ind.	Allowed value
Calling party number (Note 1)	Mandatory	(Note 2)
Basic service	Mandatory	(Note 2)
CUG index	Optional	
OA indication	Optional	ON OFF

Note 1 – FE2 may send the ENQUIRY to FE3 as soon as sufficient addressing information to identify the access can be included.

Note 2 – The values are derived from the original call set-up request. For allowed values see Recommendation Q.931 [8].

The result shall be one of the following values:

TABLE 1-6/Q.85

Name	resp. conf.	Allowed value
Non-CUG	Optional	
CUG interlock code	Optional	(Note 3)
Reject reason	Optional	(Note 2)
CUG interlock code and OA indication	Optional	(Notes 3 and 4)

Note 1 – The information elements above shall be mutually exclusive.

Note 2 – For allowed values see Recommendation Q.950 [7].

Note 3 – As specified in § 3.13 of Recommendation Q.763 [9].

Note 4 – National option.

1.7.2.5 Relationship r_e

1.7.2.5.1 Contents of ENQUIRY 2

The contents of ENQUIRY 2 shall be as in Tables 1-7/Q.85 and 1-8/Q.85.

TABLE 1-7/Q.85

ENQUIRY 2 contents

Name	req. ind	Allowed value
Called party number (Note 2)	Mandatory	(Note 3)
Basic service	Mandatory	(Note 3)
CUG interlock code (Note 1)	Optional	(Note 4)
Non-CUG	Optional	
OA indication (Note 1)	Optional	(Note 4)

Note 1 — A combination CUG interlock code with OA indication shall be supported.

Note 2 — FE4 may send the ENQUIRY to FE5 as soon as sufficient addressing information to identify the access can be included

Note 3 — The values are derived from the received call set-up request. For allowed values see Recommendation Q.931 [8].

Note 4 — As specified in § 3.13 of Recommendation Q.763 [9].

The result shall be one of the following values:

TABLE 1-8/Q.85

Name	resp. conf.	Allowed value
Non-CUG	Optional	
CUG index	Optional	
OA indication	Optional	
Reject reason	Optional	(Note 2)

Note 1 – resp. conf. conveying the combination CUG index with OA indication may be supported as a national option.

Note 2 – For allowed values, see Recommendation Q.950 [7].

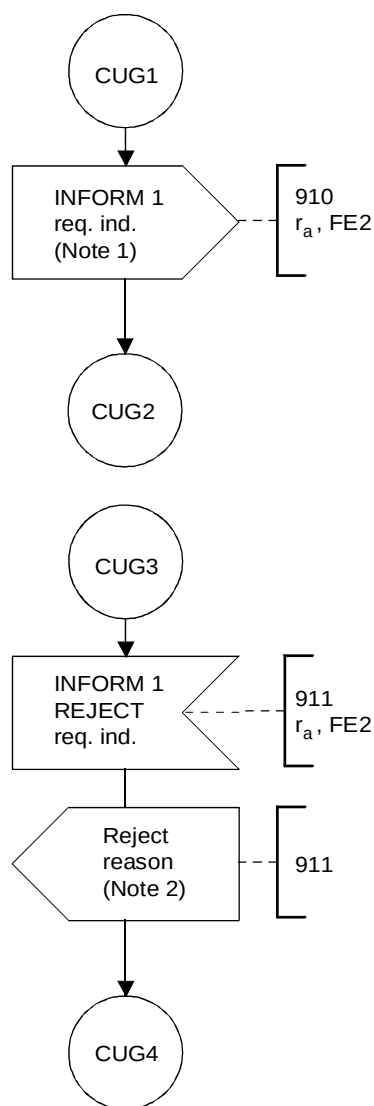
1.7.2.6 Relationship r_y

This relationship appears to be an r_c relationship to FE4 and an r_a relationship to FE2.

INFORM 1, see § 1.7.2.1.1.

INFORM 1 REJECT, see § 1.7.2.1.2.

At this relationship the CUG index is mandatory.



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Note 1 – This INFORM 1 req. ind. shall be sent simultaneously with the basic call SETUP req. ind.

Note 2 – The INFORM 1 REJECT will be processed together with the basic call clearing information flows.

Note 3 – CUG1 and CUG2 break the base call between connector S1/1 and S1/2 of Recommendation Q.71 [4].

Note 4 – CUG3 and CUG4 break the basic call transition during the CCA state “Call sent” or “Wait for further digits” or “Wait for SETUP resp. conf.” prior to the accept of SETUP resp. conf. after the receipt of SETUP REJECT req. ind., DISCONNECT req. ind. (FE411), RELEASE req. ind. (see Figure A-1/Q.71 of Recommendation Q.71 [4]).

FIGURE 1-9/Q.85

CUG, FE1

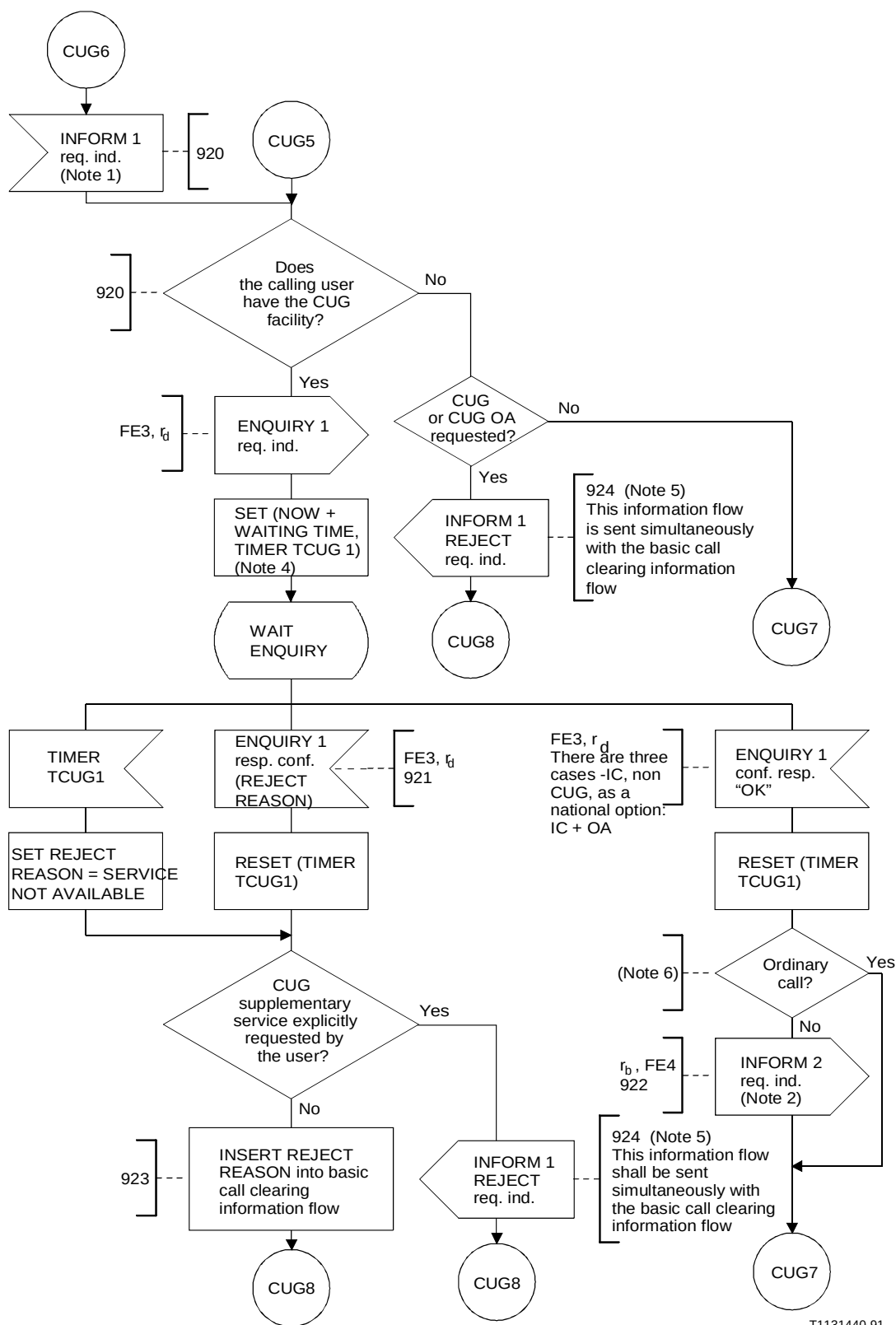


FIGURE 1-10/Q.85 (sheet 1 of 2)

CUG, FE2

Notes relative to Figure 1-10/Q.85 (sheet 1 of 2):

Note 1 – r_a , FE1 from a user end equipment – r_y from another CUG domain.

Note 2 – This INFORM 2 req. ind. shall be sent simultaneously with the basic call SETUP req. ind.

Note 3 – On a call received from an end user equipment CUG5, CUG6, CUG7 and CUG8 break the basic call between connector S2/1 and S2/2 of Recommendation Q.71 [4].

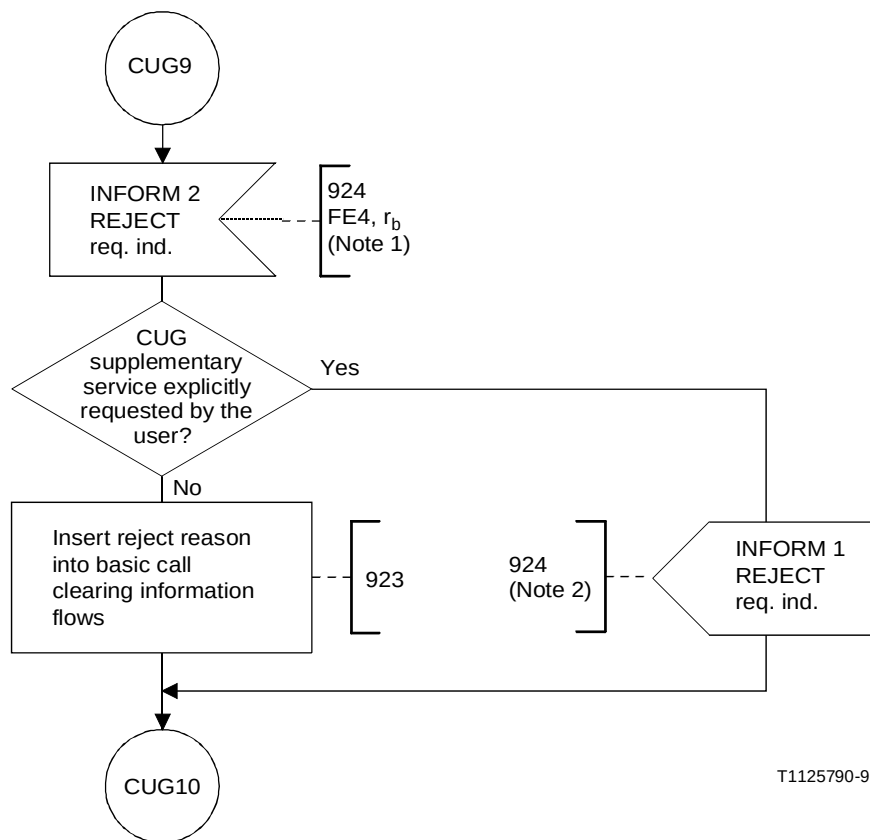
On a call received from another CUG domain of a private ISDN, CUG5, CUG6, CUG7 and CUG8 break the basic call during CC state "IDLE" during FEA 261 [see Figure 2-18/Q.71 [4] (sheet 1 of 7)] by following the YES branch of the decision "successful" and prior to sending "SETUP ind.". The analysis of MSN or DDI shall be performed prior to the invocation of CUG.

CUG7 is the exit to proceed with the call and CUG8 is the exit where the call shall be cleared, this is the same exit as the NO-branch of the preceding decision "successful" of Recommendation Q.71 [4].

Note 4 – Timer TCUG1 shall be implemented in the case of the remote data base. TCUG1 shall be automatically reset by basic call at any event resulting in clearing the call relation.

Note 5 – r_a , FE1 towards an end user equipment; r_y , FE4 towards another CUG domain.

Note 6 – The primary decision whether the call is to be set-up as a normal call or not, can be made either by FE3 or by FE2.



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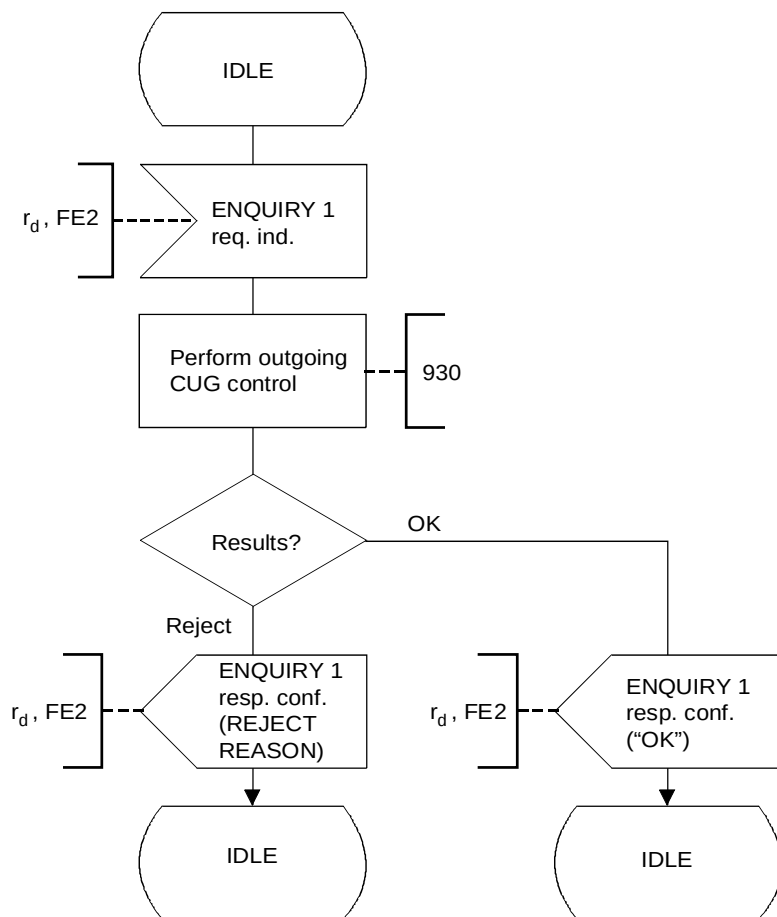
Note 1 – Information processed simultaneously with the basic call clearing information flows.

Note 2 – FE1, r_a towards a user end equipment FE4, r_y towards another CUG domain. This information flow shall be sent simultaneously with the basic call clearing information flow.

Note 3 – CUG9 and CUG10 are hooks at the receipt of basic call clearing information flows at outgoing calls prior to the receipt of SETUP resp. conf., they break the basic call between connectors S2/35 and S2/36, S2/37 and S2/38 of Recommendation Q.71 [4]. CUG9 and CUG10 additionally are hooks in CC FE2 call state r_1 - r_2 CALL SENT following the receipt of RELEASE req. ind. (see Recommendation Q.71 [4], Figure A-2/Q.71). On a call received from an other CUG domain of a private ISDN, CUG9 and CUG10 break accordingly (see Figures 2-18 CC FE6, sheet 2 of 7, sheet 3 of 7, sheet 7 of 7 of Recommendation Q.71 [4]).

FIGURE 1-10/Q.85 (sheet 2 of 2)

CUG, FE2



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FIGURE 1-11/Q.85
CUG, FE3